

Appendix 1: The Tokyo Workshop

In order to initiate the ITCT planning process a meeting was held in Tokyo, Japan on March 16-17, 2000 at the Frontier Research Systems for Global Change. The aim of the Workshop was to define the objectives of IGAC/ITCT and to identify relationships between ITCT and other science programs both within and outside IGAC. The convenors for the Tokyo Workshop were Hajime Akimoto of the University of Tokyo and FRSGC, Japan; Fred Fehsenfeld of NOAA, USA; and Stuart Penkett of the University of East Anglia, UK. Participating Countries included: China, France, Germany, India, Japan, Norway, Russia, Taiwan, USA, and UK. The Workshop goals were to:

1. Determine how currently planned research will contribute to a better understanding of ITCT.
2. Discuss how to determine the "natural background" levels of ozone and aerosols and to reliably predict how these levels might change with global climate change. How does stratospheric/tropospheric exchange and emissions from aircraft and ships affect the composition in the remote troposphere?
3. Discuss the effects of global climate change on long-range transport and consider how these effects can be evaluated.
4. Determine if this planned research can be coordinated to better understand ITCT.
5. Identify additional research that can complement programs that are already planned.
6. Identify longer-term research activities that are needed.
7. Discuss how network or satellite measurements can promote better understanding.
8. Discuss the role that instruments aboard commercial aircraft presently play and can play in the future to provide needed information.
9. Discuss what types of integrated field studies are needed. Indicate when (seasonal) and where these studies should be carried out.

The presentations and discussions focused on a review of ongoing and planned research programs and a discussion of the new science that will be required to understand the international transport and chemical transformation of anthropogenic pollution.

A. Agenda and presentations

March 16, 2000

8:40 AM Registration (SEAVANS North Building 1F Meeting room)

9:00 AM Welcome:

Taroh Matsuno, Director-General, FRSGC

Hajime Akimoto, Director of Atmospheric
Composition Research Program, FRSGC

9:15 AM Charge to Workshop:

Stuart Penkett, University of East Anglia

Fred Fehsenfeld, NOAA/Aeronomy Laboratory

PART 1: WHERE WE ARE (Fehsenfeld)

9:30 AM to 12:00 noon (wrapped around a break)

What We Know: Review of Research Accomplishments

Several major studies have been undertaken that are concerned at least in part with long-range transport and chemical transformation.

Short presentations (about 10 minutes each, two to five viewgraphs) that indicate:

What are the major findings (focus on most recent (unpublished) findings)?

Are there perceived gaps, disagreements, or inconstancies in, between, among the findings of various studies?

Presentations by:

Yutaka Kondo	Aircraft observational study
Sham Lal	INDOEX and others
Shaw Liu	Present issues after PEM-West
Oystein Hov	Observations using the EMEP data base.
Stuart Penkett	NARE: recent findings.
David Parrish	NARE: status of issues and uncertainties.
Daniel Jacobs	Results from some recent field programs.
Hanwant Singh	Issues raised by SONEX and POLINAT results.
Reg Newell	Comments regarding evolving understanding of long-range transport that can be derived from recent field studies.
Dan Jaffe	Issues raised by recent measurements.
Tim Bates	ACE I & II: status of issues and uncertainties.
Joe Prospero	Understanding long-range transport of fine particle: results from recent field programs.

10:30 AM to 11:00 AM Coffee /Tea Break

12:00 noon to 12:30 PM Discussion and Comment

12:30 PM to 1:30 PM Lunch

1:30 PM to 2:30 PM

Current Status of Modeling Capability (Akimoto)

A number of modeling concepts has been developed to simulate intercontinental transport and chemical transformation. This discussion will provide for a brief review of current modeling capability.

Short presentations (about 10 minutes each, two to five viewgraphs) that indicate:

How well are the important physical and chemical processes captured in current models?

What needs to be improved?

What do model comparisons show?

Presentations by:

Masaaki Takahashi	GCM/Tropospheric Chemistry Coupling Model
Daniel Jacob	Perspective on the status of modeling capabilities.
Michael Trainer	Comments on modeling capabilities (Levy/Carmichael).
Claire Granier	Perspective on the status of modeling capabilities. (Model Intercomparison exercise IGAC-GIM)
Oystein Hov	Perspective on the status of modeling capabilities. (Comparison of model output with measurements)

2:30 PM to 3:00 PM Discussion and Comment

3:00 PM to 3:30 PM Coffee /Tea Break

3:30 PM to 4:30 PM

Added Value: Networks, Satellites and Commercial Aircraft. (Penkett)

Currently, several strategies are being used to provide routine regional, hemispheric and global monitoring of ozone, fine particles and their precursors. This discussion will provide for a brief review of current and expected capability.

Short presentations (about 10 minutes each, two to five viewgraphs) that indicate:

How can new and emerging satellite observations be used to determine transport of continental emission to the remote marine troposphere?

What role can surface sampling networks play in determination of long-range transport and chemical transformation?

How can satellite and network measurements be augmented by instruments carried aboard commercial aircraft?

Presentations by:

Jacobs/Parrish	Satellite observations (Fishman/Thompson).
Sam Oltmans	Network observations.
John Burrows	Satellites observations.
Stuart Penkett	Mosaic/Caribic

4:30 PM to 5:00 PM Discussion and Comment

5:00 PM to 5:30 PM General Discussion, Wrap-up

6:00 PM to 8:00 PM Reception (restaurant "Star Board"
in the SEAVANS building, A-Mall 2F)

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PART 2: WHAT IS PLANNED (Fehsenfeld)

9:00 AM to 11:30 AM (wrapped around a break)

Planned research and Identification of Important Gaps.

Brief reports of major programs planned to address long-range transport from the continents. (To Europe, to Asia, to North America)

Short presentations (about 10 minutes each, two to five viewgraphs) that indicate:

How will the currently planned research contribute to a better understanding of intercontinental transport and chemical transformation (ITCT)?

Are there limitations or gaps in this approach to that question?

Presentations by:

Nikolai Elanski	Siberian study
Hajime Akimoto	Trans-Eurasian study
Mingxing Wang	Chinese conceptual plan
Yutaka Kondo	Future Japanese plan
Tim Bates	ACE Asia
Daniel Jacob	TRACE Pacific
Reg Newell	Meteorological perspective: can these programs add significant new information concerning ITCT.
Dan Jaffe	Proposed programs.
Granier/Penkett	European programs that will address ITCT.
Oystein Hov	NILU China Network
John Burrows	Eurotrac II Satellite

10:30 AM to 11:00 AM Coffee /Tea Break

PART 3: WHERE WE ARE GOING

11:30 AM to 12:00 PM

I Existing Programs: Closing the Gaps.

This discussion and comment period will address:

Given time constraints, can existing programs be complemented to fill the gaps?

Can this planned research be coordinated to better understand ITCT?

12:00 noon to 1:00 PM Lunch

1:00 PM to 2:00 PM

II Additional Research Needed: What Don't the Continents Put There? (Akimoto, Fehsenfeld, Penkett)

This discussion and comment period will address:

What are the "natural background" levels of ozone and aerosols?

Influence of stratospheric/tropospheric exchange (O₃, CO, H₂O).

Influence of surface exchange (particles, particle precursors, and ozone precursors).

Marine surfaces

Land surfaces

How do emissions from aircraft and ships affect the composition in the remote troposphere?

2:00 PM to 3:00 PM

III. Additional Research Needed. The Effect of Climate Change.

How these effects can be evaluated?

This discussion and comment period will address:

Effect of climate change on long-range transport?

Effect of climate change on the "natural background".

3:00 PM to 3:30 PM Coffee /Tea Break

3:30 PM to 5:00 PM

IV Identifying long-term research activities: perspectives on future research needs.

This discussion and comment period will address:

What types of integrated field studies are needed?

When (seasonal) and where should these studies be carried out?

What additional modeling or measurement tools are needed?

How can monitoring (by networks, satellites and commercial aircraft) contribute to these goals?

5:00 PM to 6:00 PM General Discussion, Wrap-up

A. Conclusion from the Workshop

There was a broad agreement among the participants that:

- A better understanding of the role of intercontinental transport and the intervening chemical transformation is required.
- Regional and seasonal variations in the distribution of long-lived pollutants must be observed and their sources identified.
- Trends in their distribution must be monitored and the causes understood.
- Given the magnitude of the problem, where possible existing programs should seek closer cooperation.
- Future programs should be designed to promote expanded international cooperation.

As a first step, an ITCT Coordination Committee has been established to identify opportunities for cooperative research. This will include the following members (others to be added later):

North America	F.C. Fehsenfeld, D. Parrish, H. Singh, D. Jacob,
Europe	S.A. Penkett, Ø. Hov, J. Burrows, C. Granier, K. Law
Asia	H. Akimoto, Y. Kondo, S. Liu, S. Lal

B. Future meeting and meeting aims

Two planning meetings (*USA/Europe*) have been scheduled for the coming year. The first of these meeting is scheduled for December 2000 and will be held in Boulder, CO, USA. This meeting will be restricted to the ITCT Coordination Committee. The aim of the meeting is to finalize a draft science plan for ITCT that can be circulated to all the participants of the Tokyo workshop. We hope to submit research plan to IGAC and IGBP by 1 May 2001.

The second meeting will be held in Europe in the spring of 2001. The aim of this meeting is to draft a plan for an activity to assess the extent and impact of long-range transport of air pollution. We envision that assessments will be produced on a recurring basis every four to five years. This meeting will involve the ITCT Coordination Committee and selected representatives from the policy communities of the large industrial countries. We expect the policy community will provide guidance concerning the type of information to be contained in the assessment that would be most helpful to that community.